



Juggling... a many splendored thing

MIND Contrary to conventional wisdom, you really can grow your brain after the age of three. In a study that may fundamentally change assumptions in the world of neuroscience, researchers in Germany used a functional MRI to determine whether the structure of the brain can change as a result of learning a complex skill.

Scans revealed that subjects who learned how to juggle showed an enlargement of the cerebral cortex, a portion of the brain where higher thought processes appear to be handled. Previous studies have shown that learning can result in changes in brain activity, but this study, reported in the journal *Nature* in 2004, goes further by demonstrating an anatomical change—an increase of grey matter—as a result of learning. With 50% of the population over 85 years of age afflicted with dementia who can argue the need for a bigger brain?

BODY Several years ago, the Metropolitan Life Insurance Company wanted to find out from which profession people live the longest. Doctors? Comedians? Sheep Herders? No, no, no. They learned that musical conductors live on average about five years longer than the general population. At first researchers thought this may be due to the wonderful music that surrounds them; but musicians don't live longer. Then they thought it might be the control they experience by being in charge. But managers and CEOs don't live longer. Researchers decided that it was more likely due to the upper body aerobic exercise experienced by the conductors.

We don't think of arm movements contributing to aerobic fitness, yet our arms are closer to our heart and other vital organs than our legs. We are so predisposed to think of exercise involving primarily the legs that when a doctor tells us that we need to get more exercise, most people visualize walking or jogging. When people twist an ankle or hurt their knees, they tend to think they can no longer exercise. Yet those conductors really do seem to work up a sweat.

Juggling provides an excellent upper body aerobic exercise. The heavier the object, the faster target heart rate will be reached. And those drops are great for increasing flexibility.

SPIRIT Interest has grown in the recent shift in focus in psychology from the investigation of dis-ease and negative emotions to the study of human strengths and virtues. Collectively known as Positive Psychology, researchers are making it safe, even sexy, to study the science of happiness. One oft quoted researcher, Mihaly Csikszentmihalyi, has developed a concept that could be termed an operational definition of happiness. He coined the experience FLOW.

Have you ever become so involved and absorbed with an activity that you lost track of time? People in flow become so completely focused that their sense of time is distorted. The experience is so enjoyable that people do it for the sheer pleasure of doing it, not just for external rewards. It is difficult to worry or be anxious when you are so engrossed. People in flow report a high level of happiness and well-being.

Having a clear goal and frequent feedback are key ingredients in flow. In addition, people in flow find that the challenge matches their skills. If the task is too difficult, anxiety will result—if too easy, boredom sets in. Difficulty needs to increase as skill levels raise.

People frequently report that juggling is a flow experience. It's hard to worry or ruminate while you are juggling, which is why its been called a moving meditation.

